6.3 Enteral Nutrition (Other): Continuous vs. Other Methods of Administration May 2015

There were no new randomized controlled trials since the 2009 and 2013 updates and hence there are no changes to the following Summary of Evidence.

Recommendation: *There are insufficient data to make a recommendation on enteral feeds given continuously vs. other methods of administration in critically ill patients.*

Discussion: The committee noted the lack of treatment effect in 3 studies. Concern was also expressed about the safety of bolus feeds given the probability of harm associated with aggressive, early enteral nutrition via bolus feeds as illustrated in an earlier pseudorandomized study(1).

(1) Ibrahim EH, Mehringer L, Prentice D, Sherman G, Schaiff R, Fraser V, Kollef M. Early versus late enteral feeding of mechanically ventilated patients: Results of a clinical trial. JPEN 2002;26:174-181.

Semi Quantitative Scoring

Values	Definition	Score (0,1,2,3)
Effect size	Magnitude of the absolute risk reduction attributable to the intervention listed--a higher score indicates a larger effect size	0
Confidence interval	95% confidence interval around the point estimate of the absolute risk reduction, or the pooled estimate (if more than one trial)--a higher score indicates a smaller confidence interval	1
Validity	Refers to internal validity of the study (or studies) as measured by the presence of concealed randomization, blinded outcome adjudication, an intention to treat analysis, and an explicit definition of outcomes--a higher score indicates presence of more of these features in the trials appraised	2
Homogeneity or Reproducibility	Similar direction of findings among trials--a higher score indicates greater similarity of direction of findings among trials	1
Adequacy of control group	Extent to which the control group represented standard of care (large dissimilarities = 1, minor dissimilarities=2, usual care=3)	1
Biological plausibility	Consistent with understanding of mechanistic and previous clinical work (large inconsistencies =1, minimal inconsistencies =2, very consistent =3)	2
Generalizability	Likelihood of trial findings being replicated in other settings (low likelihood i.e. single centre =1, moderate likelihood i.e. multicentre with limited patient population or practice setting =2, high likelihood i.e. multicentre, heterogenous patients, diverse practice settings =3.	1
Low cost	Estimated cost of implementing the intervention listed--a higher score indicates a lower cost to implement the intervention in an average ICU	3
Feasible	Ease of implementing the intervention listed--a higher score indicates greater ease of implementing the intervention in an average ICU	2
Safety	Estimated probability of avoiding any significant harm that may be associated with the intervention listed--a higher score indicates a lower probability of harm	2

6.3 Enteral Nutrition (Other): Continuous vs. Other Methods of Administration

Question: Does continuous administration of enteral nutrition compared to other methods of administration result in better outcomes in critically ill patients?

Summary of evidence: There were 3 level 2 studies, 2 that reviewed compared continuous enteral feeding (started at 20 to 25 ml/hr and increased by 20 to 25 ml increments every 8 to 12 hrs) to bolus (started with a bolus of 100 to 125 mls by gravity over 15 minutes every 4 to 8 hrs and increased by 100 to 125 ml increments every 8 to 12 hrs). One level 2 study compared continuous feeds (over 24 hrs) to intermittent feeds (over 18 hrs).

Mortality: One study reported on mortality and found no difference between the groups receiving continuous or intermittent feeds (Bonten 1996). In one study, there was a trend towards a reduction in ICU mortality in the group receiving continuous feeds (p 0.18, MacLeod 2007).

Infections: Two studies reported on infections and found no difference between the groups receiving continuous vs. intermittent feeds (Bonten 1996, RR 0.67, 95 % confidence intervals 0.27, 1.64) or continuous vs. bolus feeds (p = 0.45, MacLeod 2007) . Incidence of aspirations detected was not significantly different between the groups receiving continuous and intermittent (Steevens 2002, RR 0.33,95 % confidence intervals 0.02-7.24).

LOS & Ventilator days: Not reported. There were no differences between the groups in the one study that reported on ICU length of stay (p =0.69, MacLeod 2007)

Other complications: There were no significant differences in the frequency of interrupted feeds (RR 0.60, 95 % confidence intervals 0.20-1.8), the % goal feeds achieved, the number of patients with diarrhea (RR 0.40, CI 0.10-1.55) or the onset of diarrhea between the groups receiving continuous feeds and bolus feeds. Patients receiving continuous feeds received larger amounts of feeds than those receiving intermittent feeds and tolerated the feeds better in one study (Bonten 1996).

Conclusion:
There are no differences in mortality, frequency of interrupted feeds, % goal feeds achieved or diarrhea between patients receiving enteral feeds via continuous vs. other methods of administration.

Level 1 study: if all of the following are fulfilled: concealed randomization, blinded outcome adjudication and an intention to treat analysis.
Level 2 study: If any one of the above characteristics are unfulfilled

Table 1. Randomized studies evaluating continuous enteral nutrition vs. other methods of administration

Study	Population	Methods (score)	Intervention	Mortality # (%)		RR (CI)**	Infections # (%)		RR (CI)**
1) Bonten 1996	Mixed ICU's Mechanically ventilated N=60	C.Random: not sure ITT: yes Blinding: no (8)	Continuous feeds (24hrs) vs. intermittent feeds (18 hrs)	Continuous 6/30 (20)	Intermittent 9/30 (30)	0.67 (0.27-1.64)	Continuous 5/30 (17)	Intermittent 5/30 (17)	1.00 (0.32-3.10)
2) Steevens 2002	Multiple trauma patients, surgical, medical ICU's N=18	C.Random: not sure ITT: yes Blinding: no (8)	Continuous enteral nutrition (started @ 25 ml/hr and ↑ by 25 mls q 12 hrs)vs bolus (125 mls by gravity over 15 minutes q 4 hrs and ↑ by 125 mls q 12 hrs.	Continuous NR	Bolus NR		Continuous Aspiration 0/9 (0)	Bolus Aspiration 1/9 (11)	0.33 (0.02-7.24)
3) MacLeod 2007	Trauma patients N=164	C.Random: not sure ITT: no Blinding: no (5)	Continuous enteral nutrition (started @ 20 ml/hr for 8 hrs and ↑ by 20 mls q 8 hrs) vs. bolus (100 mls q 4 hrs and ↑ by 100 mls q 8 hrs.	Continuous ICU 6/81 (7)	Bolus ICU 11/79 (14)	p=0.18	Continuous Pneumonia 33/81 (41)	Bolus Pneumonia 38/79 (48)	p=0.45

Table 1. Randomized studies evaluating continuous enteral nutrition vs. other methods of administration (continued)

Study	LOS days		Ventilator days		Cost		Other	RR (CI)**
1) Bonten 1996	Continuous NR	Intermittent NR	Continuous NA	Intermittent NA	Continuous NA	Intermittent NA	Continuous Intermittent # patients with decreased feeds 2/30 (7) 5/30 (17)	0.40 (0.08-1.90)
2) Steevens 2002	Continuous NR	Bolus NR	Continuous NR	Bolus NR	Continuous NR	Bolus NR	Continuous Bolus # patients with diarrhea 2/9 (22) 5/9 (56) # patients with interrupted feeds 3/9 (33) 5/9 (56) % goal feeds achieved 87% 86.8%	0.40 (0.10-1.55) 0.60 (0.20-1.8)
3) MacLeod 2007	Continuous ICU 20.1 ± 1.7* (81)	Bolus ICU 21.2 ± 2 *(79)	Continuous NR	Bolus NR	Continuous NR	Bolus NR	Continuous Bolus Onset of diarrahea 3/81 (4) 5/79 (79) % total calories for 1st 7 days 58.3 ± 4* 60.2 ± 4.2* Patients extubated prior to day 7 7/81 (9) 5/79 (6)	p=0.45 p>0.05 p=0.58

C.Random: concealed randomization NA: not available * RR = relative risk CI= confidence intervals ITT: intent to treat * SEM (Standard error mean)